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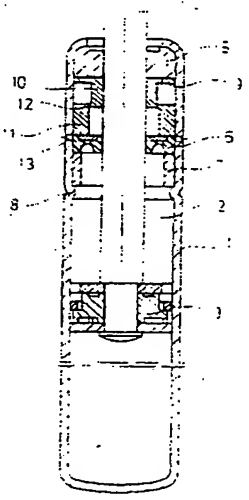
(54) An emergency fluid exit arrangement of a cylinder piston device and a cylinder piston device with such an emergency fluid exit arrangement.

(57) According to an illustrative example of the invention a gas spring is provided with an emergency exit permitting escape of pressurized gas in case of said pressurized gas exceeding a predetermined pressure. The emergency exit is provided by a radial bore (13) through the cylinder (1). This radial bore is covered unter normal conditions by a piston rod seal (6). This piston rod seal (6) is axially displaceable by said pressurized gas at said predetermined pressure such that the radial bore (13) is opened for escape of pressurized gas.

Fig. 1



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BACKGROUND OF THE INVENTION

Cylinder piston devices like gas springs or hydropneumatic springs or hydromechanic springs are frequently used as positioning and gravity compensating elements in many mechanical constructions, for example, in motor vehicles for positioning and weight compensation of boot flaps or engine hoods. Moreover, such cylinder piston devices are used as pressure storing elements. The extension force of such cylinder piston devices is adapted to the respective application by selecting the pressure of a fluid within the respective cylinder piston device. The pressure of this fluid within the cylinder piston device can be increased considerably beyond the respective operational pressure by increase of temperature or by mechanical deformation of the device itself or the mechanical construction incorporating the respective cylinder piston device.

STATEMENT OF THE PRIOR ART

From the German patent application 24 57 938 it is known to provide breaking points on at least one of the cylinder and the piston rod to act as emergency exit for the respective pressurized fluid. In case of temperature increase by fire or in case of mechanical deformation of the respective vehicle by a crash accident the cylinder or piston rod can break. Thus the pressurized fluid can escape. There is, however, a risk that parts of the cylinder piston device are separated from the remainder of the cylinder piston device at the breaking points. The separated parts may fly away with high velocity and are a risk for sensitive parts of the respective mechanical construction and for persons standing close to the cylinder piston device.

OBJECT OF THE INVENTION

It is a primary object of the present invention to provide a cylinder piston device with an emergency exit for the respective pressurized fluid in which an escape of the pressurized fluid without the risk of constructional members flying away is possible.

It is a further object of the present invention to provide a cylinder piston device which is in case of an opening of the emergency exit still operable at least to such an extent that the piston rod is still axially guided by the cylinder.

It is a further object of the present invention to provide a cylinder piston device in which the opening of the emergency exit occurs within a relatively narrow range adjacent a predetermined temperature and/or within a narrow range adjacent a predetermined pressure of the fluid.

It is a further object of the present invention to provided a cylinder piston device which can be easily and at low costs manufactured in accordance with usual design principals.

SUMMARY OF THE INVENTION

The invention refers to an emergency fluid exit arrangement of a cylinder piston device.

The cylinder piston device comprises a cylinder member having an axis, a circumferential wall and two ends and defining a cavity within the cylinder member axially between the two ends. A piston rod member is axially guided through at least one of the two ends by piston rod guiding and sealing means. A volume of pressurized fluid is provided within the cavity and acts onto the piston rod member. An emergency exit permits escape of fluid from the cavity under emergency conditions. The piston rod member is telescopically movable with respect to the cylinder member against the action of the pressurized fluid. The cylinder member and the piston rod member have basic operational shapes. The basic operational shapes of the cylinder member and the piston rod member are substantially unchangeable in case of an opening of the emergency exit. As the shape of the cylinder member and the shape of the piston rod member remain substantially unchanged in case of an opening of the emergency exit there is no risk of parts of the cylinder member and the piston rod member flying away into the sourrounding space.

The piston rod member remains telescopically movable with respect to the cylinder member along a major part of an operational stroke of the piston rod member in case of the emergency exit being opened. As a result thereof the constructional parts of the construction incorporating the respective cylinder piston device are still movable with respect to each other when the emergency exit is opened due to increased temperature or due to increased pressure. While the expected function of the cylinder piston device of, for example, weight compensation is not further fulfilled after escape of the pressurized fluid the movement of the respective parts of the mechanical construction by hand is not prevented. This can be of considerable value in case of an accident especially a fire accident.

If the piston rod is provided with a piston unit within a cavity and a piston unit is movable along an operational range of movement with respect to the cylinder member, the emergency exit should be located at a location of the cylinder member axially remote from the operational range of movement.

According to a preferred design principle the emergency exit comprises fluid passage means for connecting the cavity with atmosphere and a valve

member. The valve member is changeable from a closing status to an opening status in response to a predetermined value of at least one of: pressure of the fluid and temperature at a temperature-sensing location of the cylinder piston device. The fluid passage means are thus closed by the valve member in the closing status therof and permit escape of fluid in the opening status of the valve member.

In order to prevent flying away of the valve member the cylinder piston device may comprise catching means preventing separation of the valve member from the cylinder piston device in case of transition of the valve member from the closing status towards the opening status. These catching means may be provided by the cavity itself when the valve member is provided within the cavity.

Preferably the fluid passage means and the valve member are located at a location outside an operational range of movement of a piston unit connected with the piston rod member inside the cavity. Thus any conflict of the piston unit with the valve member is avoided.

For example, the fluid passage means and the valve member may be located adjacent the guiding and sealing means of the piston rod member.

Alternatively, the passage means and the valve member may be located adjacent an end wall of the cylinder member remote from the guiding and sealing means.

The valve member may be a sliding valve member movable along a sliding face of the cylinder piston device and the fluid passage may intersect with the sliding face.

The valve member is, for example, directly subject to the pressure of the pressurized fluid and is supported in its closing status by support means against the action of the pressurized fluid acting onto the valve member. In this case the support means can be sensitive to the predetermined value of either the pressure of the fluid and/or the temperature-sensing location of the cylinder piston device. The temperature-sensing location is preferably the location of the support means themselves.

The support means may be destroyable in response to the predetermined value of pressure of the pressurized fluid. Alternatively, the support means may be destroyable in response to the predetermined value of temperature. According to a further alternative the support means may be destroyable by combined action of increased pressure and increased temperature.

A still further alternative is to provide support means having a temperature-sensitive support capability decreasing with increasing temperature such that at the predetermined value of temperature, the support capability is insufficient to maintain the valve member in the closing status against the action of the pressurized fluid.

The support means may also be elastic support means according to a further alternative.

A further design principle is possible according to which the valve member is destroyable in response to the predetermined value of at least one of: pressure of the fluid and temperature at a temperatur-sensing location of the cylinder piston device.

In order to obtain a most simple mechanical design a substantially cylindrical internal sliding face may be provided adjacent the circumferential wall. In this case the sliding valve member may be an annular valve member cooperating with the substantially cylindrical internal sliding face.

The annular valve member may comprise a piston rod sealing member located radially between the cylindrical wall and the piston rod member. Such the piston rod sealing member fulfills a second function besides its sealing function. Thus the total design becomes less expensive and requires a reduced number of components.

The annular valve member may be axially supported by an annular support member. This annular support member may be axially supported adjacent an end thereof remote from the annular valve member by the cylinder member adjacent that end therof through which the piston rod member is guided. The annular support member may again be sensitive to the predetermined value of at least one of: pressure of the fluid and temperature at the temperature-sensing location.

A most convenient form of the annular support member comprises two axially subsequent and radially off-set ring portions interconnected by radial connection means. These radial connection means are destroyable in response to a predetermined axial force exerted by the pressurized fluid through the annular valve member onto the annular support member. Thus the ring portions are telescopically movable with respect to each other in response to destruction of the radial connection means. The radial connection means may be an integral part of said ring portions.

Alternatively, the annular support member may be made of a material of a rigidity decreasing with increasing temperature. Thus in case of a fire accident the support member becomes weaker and is finally overcome by the force exerted by the pressurized fluid.

There is further the possibility of using an annular support member comprising annular spring means. These annular spring means may, for example, comprise a stack of cup springs.

The fluid passage means may comprise at least one bore extending in radial direction through the circumferential wall at or adjacent the substantially cylindrical internal sliding face. Thus the bore may be covered or uncovered according to the

axial position of the annular valve member. Alternatively, the fluid passage means may comprise at least one substantially axially extending groove adjacent the substantially cylindrical internal sliding face. In this case the fluid passage means are opened when the groove extends across the annular valve member.

The design principle of a destroyable valve member may be realized in practice as follows: the valve member is an annular valve member located radially between the circumferential wall and the piston rod member and is subject to the pressure of the pressurized fluid. The annular valve member is axially supported against the pressure of the pressurized fluid by an annular support face. This annular support face supports, however, only one of two radially adjacent ring portions of the annular valve member. A second one of the ring portions is unsupported. The first and the second ring portions are axially shearable with respect to each other in response to the predetermined value of the pressurized fluid. The shearing stability may be also influenced by the temperature. Also with this embodiment the annular valve member may be an annular piston rod sealing member such that the annular valve member fulfills a double function.

The annular valve member may comprise in such a construction a resilient sealing material reinforced by a reinforcing ring member. This reinforcing ring member may be provided with a weakened zone sensitive to shearing forces.

The fluid passage means may comprise a fluid collecting chamber within the cylinder member. The fluid collecting chamber may have an exit towards atmosphere.

The guiding and sealing means may comprise an annular guiding member having an internal guiding surface. In such a construction the fluid passage means may comprise at least one substantially axially extending groove in the guiding surface.

The pressurized fluid is preferably a pressurized gas. In this case the cylinder piston device acts as a so called gas spring.

According to a further aspect, this invention refers to a cylinder piston device. The cylinder piston device comprises a cylinder member having an axis, a circumferential wall and two ends and defining a cavity axially between its two ends. A pisto rod member is axially guided through at least one of said two ends by piston rod guiding and sealing means. A volume of pressurized fluid is contained within the cavity and acts onto the piston rod member. An emergency exit permits escape of fluid from the cavity under emergency conditions. The piston rod member is telescopically movable with respect to the cylinder member aginst the action of the pressurized fluid. A valve structure is provided for cooperation with the emergency exit. This valve structure is transferable from a closing status to an opening status in response to a predetermined value of at least one of: pressure of the fluid and temperature at a temperature-sensing location of the cylinder piston device. The emergency exit is closed by the valve structure in the closing status thereof and permits escape of fluid toward atmosphere in the opening status of the valve structure. The valve structure is subject to the pressure of the pressurized fluid and is supported in its closing status by support means against the action of the pressurized fluid acting onto the valve structure.

The support means comprise at least one support member supported by the cylinder member and having a supporting face axially opposite to a counter-support face allocated to the valve structure. The support member is sensitive to the predetermined value of at least one of: pressure of the fluid and temperature at the temperature-sensing location of the cylinder piston device.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part of the disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be explained in greater detail hereinafter with reference to embodiments shown in the accompanying drawings in which

- Fig. 1 is a longitudinal section through a pneumatic gas spring with a destroyable support bush;
- Fig. 2 shows a detail of a gas spring in the region of the piston rod seal with a support ring weakenable at increasing temperature;
- Fig. 3 shows the region of the piston rod seal of a gas spring with a support spring;
- Fig. 4 shows the region of the piston rod seal of a gas spring, werein the fluid passage is formed by a longitudinal groove;
- Fig. 5 shows a further embodiment in which the piston rod seal is provided with a destroyable disk and
- Fig. 6 shows the gas spring according to Figure 5 with the disk being broken.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

When employing such cylinder piston rods in the construction of motor vehicles to simplify operation of the boot flap or the engine hood, pneumatic or hydropneumatic springs ar preferred. For this purpose, the cylinder piston rod is articulated on the one hand to the flap or hood and, on the other hand, to a part which is rigid with the chassis. The gas spring according to Figure 1 has a cylinder 1 in the cavity 2 of which there is provided a pressurized fluid preferably a gas filling. A piston rod 4 is provided with a piston 3 and is guided through a piston rod guide 5 and a piston rod seal 6 in the cylinder 1. The cavity 2 is sealed from the exterior. At least a small quantity of liquid lubricant is provided in the cavity 2 for lubricating the piston rod 4. A spacer bush 7 is supported on the one hand by a radially inwards directed annular projection 8 acting as a stop and serves, on the other hand, as an abutment for the piston rod seal 6. Between the piston rod guide 5 and the piston rod seal 6 there is located a destroyable support bush 9 which consists of a radially inner ring portion 10 and a radially outer ring portion 11. These ring portions 10 und 11 are connected by a connecting bridge 12. The connecting bridge 12 is dimensioned such that it breaks from a predetermined axial force acting onto the support bush 9. In this case, the outer ring portion 11 is slid over the inner ring portion 10 so that the piston rod seal 6 can move axially upwardly and, in so doing, passes over and clears bores 13 arranged in the cylinder 1 so that the pressurized fluid in the cavity 2 can escape via these bores 13 into the atmosphere owing to the displacement of the piston rod seal 6. Protection against excess pressure is provided in this way, avoiding an unallowably high rise in pressure in the cavity 2. The connecting bridge 12 of the support bush 9 is designed such that it breaks only when the pressure in the cavity 2 unallowably exceeds a predetermined pressure above the operating pressure, which can occur, for example, during a fire in the vehicle.

In the embodiment according to Figure 2, the annular support member arranged between the piston rod guide 5 and the piston rod seal 6 consists of a thermoplastic polymer. The yieldability of this support bush 14 is so great at a predetermined temperature that the piston rod seal 6 clears the bores 13 and the cavity 2 is therefore opened to the atmosphere so that, at an unallowably high temperature of the gas spring, the pressure can be blown out of the cavity 2. Parts which are equivalent to those parts of Figure 1 are designated by the same reference numerals.

The embodiment according to Figure 3 exhibits a piston rod seal 6 which is supported against the pressure in the cavity 2 via a pretensioned spring formed by Belleville spring washers 18. These Belleville spring washers 18 are supported on the one hand on a lower end face of the piston rod guide 5 and act onto a contact ring 17 of which the axial movement is limited by a stop 19. The spacer ring 16 rests on the piston rod seal 6 and cooperates with the contact ring 17 so that, in the event of an unallowably high rise in temperature in the cavity 2, the piston rod seal 6 is displaced upwardly against the force of the prestressed Belleville spring washers 18 and the connection between the cavity 2 and the atmosphere via the bores 13 is thus produced. An abutment ring 15 which is supported on the projection 8 of the cylinder 1 is provided for limiting the piston rod seal 6 axially from the cavity 2.

The embodiment shown in Figure 4 differs from the one in Figure 1 essentially in that a longitudinal groove 20 located in the cylinder 1 cooperates with the piston rod seal 6. This longitudinal groove 20 bridges over the support bush 9 and the piston rod guide 5 and opens into the atmosphere. As the pressure in the cavity 2 rises above a maximum permitted extreme pressure, the support bush 9 is slid together by breakage of the connecting bridge and the piston rod seal 6 travels over the longitudinal groove 20. The connection between the cavity 2 and the atmosphere via the longitudinal groove 20 is then produced. The longitudinal groove 20 is advantageously formed by cold working so that no splinters or burrs are formed, which could impair operation of the cylinder piston device.

A further embodiment of a cylinder piston device shown in Figures 5 and 6 comprises a shearable disk 21 which is embedded into the piston rod seal 6. The upper end face of the piston rod seal 6 rests on an abutment ring 26 which forms a chamber 25 with the internal side of the cylinder 1. This chamber 25 communicates via at least one radially extending channel 24 and an axial groove 23 with the atmosphere. The axial groove can also be replaced be a clearance between the piston rod 4 and the piston rod guide 5, such forming an axial channel which is annular in cross section. The shearable disk 21 has a predetermined breaking point 22 which is designed such that the shearable disk is sheared if a maximum allowable pressure in the cavity 2 is exceeded. The piston rod seal 6 is also divided in such situation and the radially outer part of the piston rod seal resting on the internal wall of the cylinder 1 is pressed with the associated part of the shearable disk 21 into the chamber 25, as shown in Figure 6. The connection between the cavity 2 and the atmosphere is thus

produced and the pressurized fluid can escape from the cavity 2 via the radially extending channel 24 and the axial groove 23 into the atmosphere so that the internal pressure of the gas spring is reduced.

While specific embodiments of the invention have been shown and described in detail to illustrate the application of the inventive principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

The reference numerals in the claims are only used for facilitating the understanding and are by no means restrictive.

Claims

1. An emergency fluid exit arrangement in a cylinder piston device, said cylinder piston device comprising a cylinder member (1) having an axis, a circumferential wall and two ends and defining a cavity (2) within said cylinder member (1) axially between said two ends, a piston rod member (4) axially guided through at least one of said two ends by piston rod guiding and sealing means (5,6), a volume of pressurized fluid within said cavity (2) and acting onto said piston rod member (4) and an emergency exit (13) permitting escape of fluid from said cavity (2) under emergency conditions, said piston rod member (4) being telescopically movable with respect to said cylinder member (1) against the action of said pressurized fluid, said cylinder member (1) and said piston rod member (4) having respective basic operational shapes, said basic operational shapes of said cylinder member (1) and said piston rod member (4) being substantially unchangeable in case of an opening of said emergency exit (13).

2. An emergency fluid exit arrangement as set forth in claim 1,
said piston rod member (4) remaining telescopically movable with respect to said cylinder member (1) along a major part of an operational stroke of said piston rod member (4) in case of said emergency exit (13) being opened.

3. An emergency fluid exit arrangement as set forth in claim 1 or 2,
said piston rod member (4) being provided with a piston unit (3) within said cavity (2), said piston unit (3) being movable along an operational range of movement with respect to said cylinder member (1), said emergency exit (13) being located at a location of said cylinder member (1) axially remote from said operational range of movement.

4. An emergency fluid exit arrangement as set forth in one of claims 1 to 3,
said emergency exit (13) comprising fluid passage means (13) for connecting said cavity (2) with atmosphere and a valve member (6), said valve member (6) being changeable from a closing status to an opening status in response to a predetermined value of at least one of: pressure of said fluid and temperature at a temperature-sensing location of said cylinder piston device, said fluid passage means (13) being closed by said valve member (6) in said closing status thereof and permitting escape of fluid in the opening status of said valve member (6).

5. An emergency fluid exit arrangement as set forth in claim 4,
said cylinder piston device comprising catching means (1) Preventing separation of said valve member (6) from said cylinder piston device in case of transition of said valve member (6) from said closing status towards said opening status.

6. An emergency fluid exit arrangement as set forth in claim 4 or 5,
said fluid passage means (13) and said valve member (6) being located at a location outside an operational range of movement of a piston unit (3) connected with said piston rod member (4) inside said cavity (2).

7. An emergency fluid exit arrangement as set forth in claim 6,
said fluid passage means (13) and said valve member (6) being located adjacent said guiding and sealing means (5,6).

8. An emergency fluid exit as set forth in claim 6,
said passage means and said valve member being located adjacent an end wall of said cylinder member (1) remote from said guiding and sealing means (5,6).

9. An emergency fluid exit arrangement as set forth in one of claims 4 to 8,
said valve member (6) being a sliding valve member (6) movable along a sliding face of said cylinder piston device, said fluid passage means (13) intersecting said sliding face.

10. An emergency fluid exit arrangement as set forth in one of claims 4 to 9,
said valve member (6) being subject to the

pressure of said pressurized fluid and being supported in its closing status by support means (9) against the action of said pressurized fluid acting onto said valve member (6), said support means (9) being sensitive to said predetermined value of at least one of: pressure of said fluid and temperature at a temperature-sensing location of said cylinder piston device.

11. An emergency fluid exit arrangement as set forth in claim 10,
said support means (9) being destroyable in response to said predetermined value of pressure of said pressurized fluid.

12. An emergency fluid exit arrangement as set forth in claim 10,
said support means (14) being destroyable in response to said predetermined value of temperature.

13. An emergency fluid exit-arrangement as set forth in claim 10,
said support means (14) having a temperature-sensitive support capability decreasing with increasing temperature such that at said predetermined value of temperature, the support capability is insufficient to maintain said valve member (6) in said closing status against the action of said pressurized fluid.

14. An emergency fluid exit arrangement as set forth in claim 10,
said support means (18) being elastic, and preferably prestressed support means.

15. An emergency fluid-exit arrangement as set forth in one of claims 4 to 9,
said valve member (6,21) being destroyable in response to said predetermined value of at least one of: pressure of said fluid and temperature at a temperature-sensing location of said cylinder piston device.

16. An emergency fluid exit arrangement as set forth in one of claims 9 to 14,
a substantially cylindrical internal sliding face being provided adjacent said circumferential wall, said sliding valve member (6) being an annular valve member (6) cooperating with said substantially cylindrical internal sliding face.

17. An emergency fluid exit arrangement as set forth in claim 16,
said annular valve member (6) comprising a piston rod sealing member located radially between said circumferential wall and said piston rod member.

18. An emergency fluid exit arrangement as set forth in claim 16 or 17,
said annular valve member (6) being axially supported by an annular support member (9), said annular support member being axially supported adjacent an end thereof remote from said annular valve member (6) by said cylinder member (1) adjacent said one end thereof, said annular support member (9) being sensitive to said predetermined value of at least one of: pressure of said fluid and temperature at said temperature-sensing location.

19. An emergency fluid exit arrangement as set forth in claim 18,
said annular support member (9) comprising two axially subsequent and radially off-set ring portions (10,11) interconnected by radial connection means (12), said radial connection means (12) being destroyable in response to a predetermined axial force exerted by said pressurized fluid through said annular valve member (6) onto said annular support member (9), said ring portions (10,11) being telescopically movable with respect to each other in response to destruction of said radial connection means (12).

20. An emergency fluid exit arrangement as set forth in claim 19,
said radial connection means (12) being an integral part of said ring portions (11,10).

21. An emergency fluid exit arrangement as set forth in claim 18,
said annular support member (14) comprising a material of a rigidity decreasing with increasing temperature.

22. An emergency fluid exit arrangement as set forth in claim 18,
said annular support member comprising annular spring means (18).

23. An emergency fluid exit arrangement as set forth in claim 22,
said annular spring means (18) comprising a stack of cup springs of the Belleville type.

24. An emergency fluid edit arrangement as set forth in one of claims 16 to 23,
said fluid passage means comprising at least one bore (13) extending in radial direction through said circumferential wall at or adjacent said substantially cylindrical internal sliding

face.

25. An emergency fluid exit arrangement as set forth in one of claims 16 to 23, said fluid passage means comprising at least one substantially axially extending groove (20) adjacent said substantially cylindrical internal sliding face.

26. An emergency fluid exit arrangement as set forth in one of claims 4 to 9, 15, 16 and 17, said valve member being an annular valve member (6,22) located radially between said circumferential wall and said piston rod member (4) and being subject to the pressure of said pressurized fluid, said annular valve member (6,22) being axially supported against the pressure of said pressurized fluid by an annular support face (26), said annular support face (26) supporting only one of two radially adjacent ring portions of said annular valve member (6,22), a second one of said ring portions being unsupported, said first and said second ring portions being axially shearable with respect to each other in response to said predetermined value of said pressurized fluid.

27. An emergency fluid exit arrangement as set forth in claim 26, said annular valve member (6,22) being an annular piston rod sealing member (6,22).

28. An emergency fluid exit arrangement as set forth in claim 26 or 27, said annular valve member (6,22) comprising a resilient sealing material (6) reinforced by a reinforcing ring member (21), said reinforcing ring member (21) being provided with a weakened zone (22) sensitive to shearing forces.

29. An emergency fluid exit arrangement as set forth in claims 4, 26 and 27, said fluid passage means comprising a fluid collecting chamber (25) within said cylinder member (1), said fluid collecting chamber (25) having an exit (13) towards atmosphere.

30. An emergency fluid exit arrangement as set forth in one of claims 1 and 26 to 29, said guiding and sealing means (5,6) comprising an annular guiding member (5) having an internal guiding surface, said fluid passage means comprising at least one substantially axially extending groove (23) in said guiding surface.

31. An emergency fluid exit arrangement as set forth in one of claims 1 to 30, said pressurized fluid being a pressurized gas.

32. A cylinder piston device comprising a cylinder member (1) having an axis, a circumferential wall and two ends and defining a cavity (2) within said cylinder member (1) axially between said two ends, a piston rod member (4) axially guided through at least one of said two ends by piston rod guiding and sealing means (5,6), a volume of pressurized fluid within said cavity (2) and acting onto said piston rod member (4) and an emergency exit (13) permitting escape of fluid from said cavity (2) under emergency conditions, said piston rod member (4) being telescopically movable with respect to said cylinder member (1) against the action of said pressurized fluid, a valve structure (6) being provided for cooperation with said emergency exit (13), said valve structure (6) being transferable from a closing status to an opening status in response to the predetermined value of at least one of: pressure of said fluid and temperature at a temperature-sensing location of said cylinder piston device, said emergency exit (13) being closed by said valve structure (6) in said closing status thereof and permitting escape of fluid toward atmosphere in said opening status of said valve structure (6), said valve structure (6) being subject to the pressure of said pressurized fluid and being supported in its closing status by support means (9) against the action of said pressurized fluid acting onto said valve structure (6), said support means (9) comprising at least one support member (9) supported by said cylinder member (1) and having a supporting face axially opposite to a counter-support face allocated to said valve structure (6), said support member (9) being sensitive to said predetermined value of at least one of: pressure of said fluid and temperature at said temperature-sensing location of said cylinder piston device.

33. A cylinder piston device as claimed in claim 32, further comprising features of at least one of claims 1 to 31.

Fig. 1

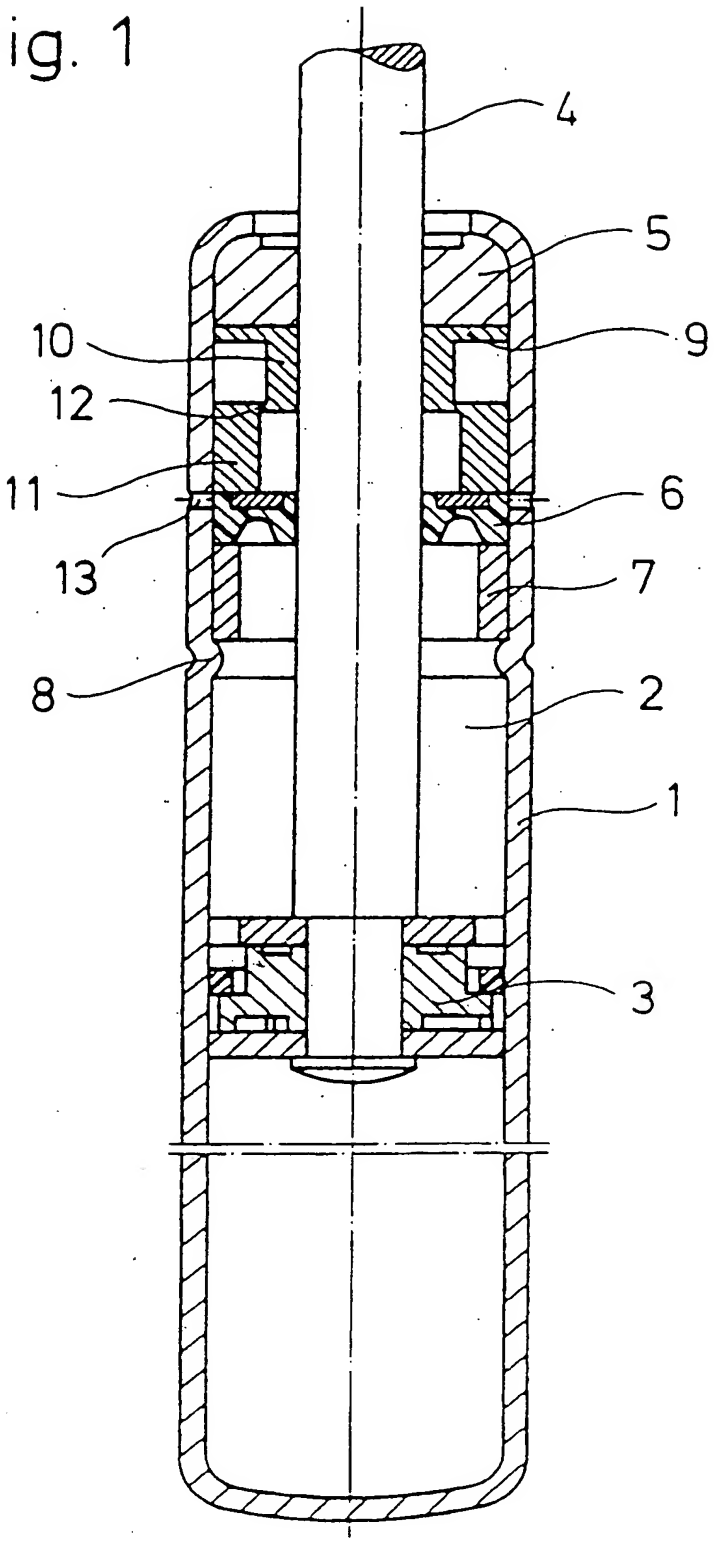


Fig. 2

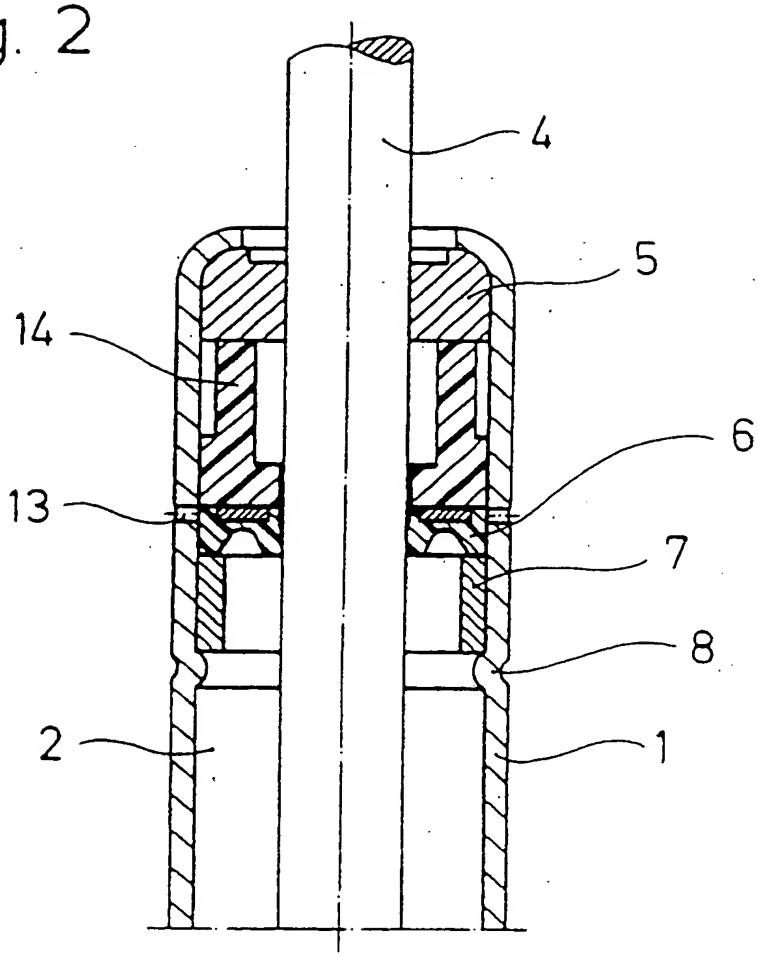


Fig. 3

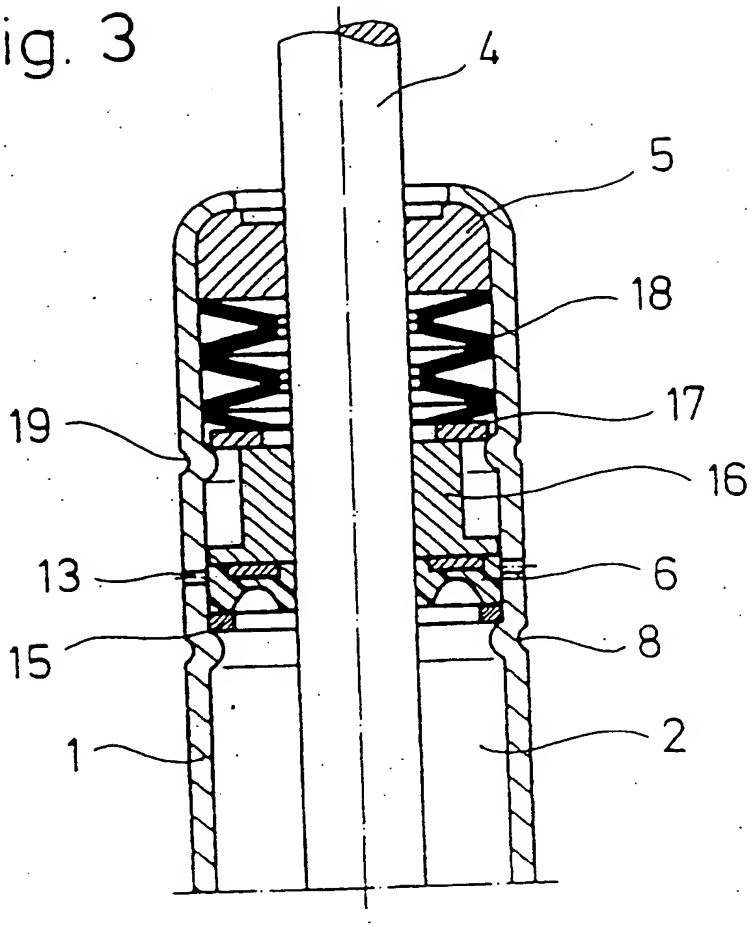


Fig. 4

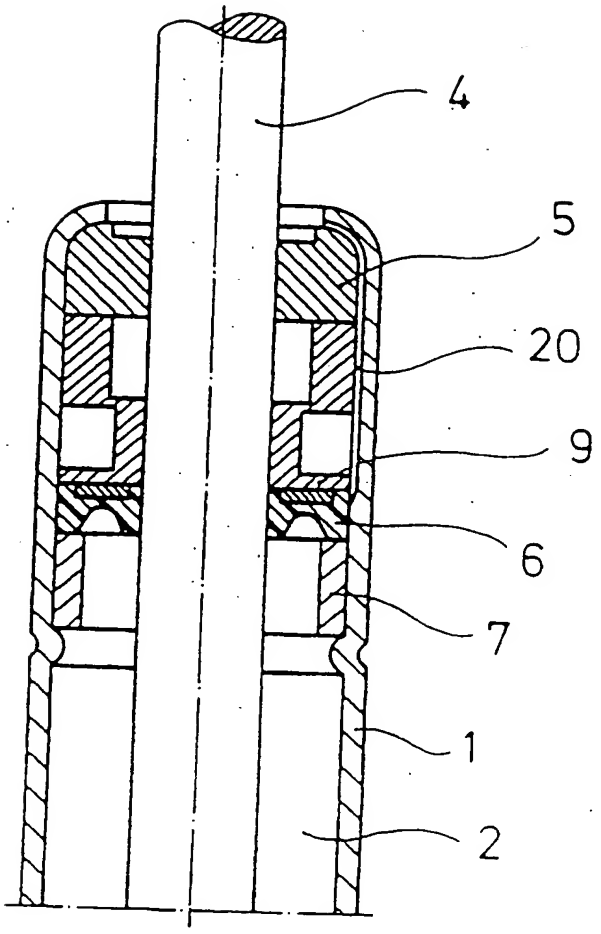


Fig. 5

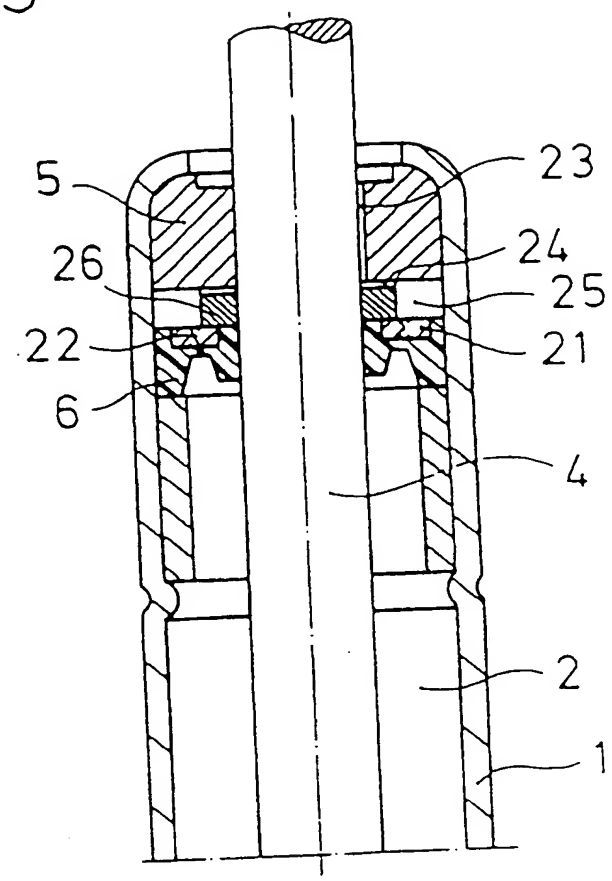
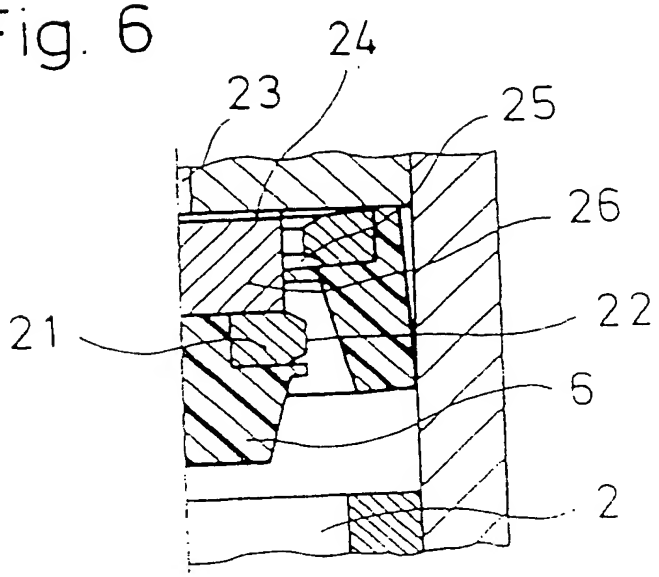


Fig. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 9999

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
D,A	DE-A-24 57 938 (STABILUS ET AL.) * the whole document *	1,32	F16F9/02
A	DE-U-89 06 615 (BANSBACH ET AL.) * claims 1-4; figure 1 *	1,4,8,32	
A	GB-A-913 622 (BOUGEARD) * the whole document *	1,8,32	

TECHNICAL FIELDS SEARCHED (Int.Cl.5)

F16F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	1 February 1995	Van der Veen, F

CATEGORY OF CITED DOCUMENTS

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